TURBO 040™

68040 UPGRADE CARD

DAYSTAR®
DIGITAL

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About The Turbo 040

Thank you for purchasing the DayStar Turbo 040. You have purchased a performance upgrade with unsurpassed compatibility, reliability and performance.
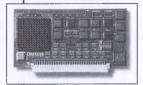
The Turbo 040 substantially increases Macintosh system speed and responsiveness. Users benefit through increased productivity - complete more work in a day or spend the time saved to improve work quality.

There are two versions of the Turbo 040. The standard Turbo 040 uses the Motorola 68040 CPU, which includes a built-in floating point unit (FPU) for high-speed 3-D rendering, complex spreadsheet recalcs, and scientific and statistical applications. The Turbo 040i uses the Motorola 60LC040, which leaves out the FPU. Throughout this manual, we will simply refer to both models as the Turbo 040.

The Turbo 040 has a 128K high speed Static RAM cache that provides data at zero wait-states. This allows the CPU to operate at peak performance.

Included with the Turbo 040 is DayStar's PowerMath, a powerful software utility that boosts the performance of math-intensive tasks which don't use the math chip directly. PowerMath traps application calls to Apple's Standard Apple Numeric Environment (SANE) routines and diverts them to the built-in math routines of the 68040. This greatly increases performance over that of SANE without compromising accuracy, a feature unique to DayStar's software.

About the Turbo 040

NOTE: Although this manual covers the installation of the Turbo 040 into many different Macs, be sure to check the Turbo box for a list of Macs that this particular board supports.

Upgrade Program

DayStar has always provided upgrade paths for its customers. For further information on upgrading to more speed or changing platforms, turn to page 127, "Upgrading the Turbo 040", in Appendix B.

Included with your Turbo 040

The Turbo 040 is shipped with the following parts:

- · Turbo 040 in an anti-static bag
- · Turbo 040 Installation Manual
- · QuadControl disk
- · PowerDemo disk
- · Network Installer disk
- · Anti-Static wrist strap

Included with your Adapter

Included with your adapter:

- · PGA puller (II and IIx versions only)
- · Power Supply removal tool (IIcx version only)
- · Anti-Static Motherboard Bag (IIcx version only)
- · Electrical tape (removable - 2 pcs. on a strip) (SE/30 version only)
- · Case Separating Tool (SE/30 version only)
- · Torx-like screwdriver (SE/30 version only)
- · Rubber pad (IIx version only)
- · Metal shield and 6 screws (Adapter IIsi - NuBus version only)

If any of the parts above are missing when you receive your Turbo 040, please contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544, AppleLink: DAYSTAR.TECH, America Online: DAYSTAR OL or GEnie: DAYSTAR.

About The Turbo 040

Installation tools required:

- Phillips screwdriver

As DayStar continues to improve and enhance its product line, we would like to keep you informed of new product advancements. To take advantage of our upgrade programs and new product releases, please take a moment to complete the product warranty card.

This manual provides basic information for installing and using the DayStar Turbo 040. If you are unfamiliar with using the Macintosh, review the Owner's Guide before installing the board.

Here's what you'll find in this manual:

- **Chapter 1:** "Getting Started" lists some of the precautions which should be taken before installation. It also includes quick reference sections for installing the Turbo 040.

- **Chapter 2:** "Installing The Turbo 040 - Mac SE/30" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac SE/30. It includes a section on testing the installation.

- **Chapter 3:** "Installing The Turbo 040 - Mac II" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac II. It includes a section on testing the installation.

- **Chapter 4:** "Installing The Turbo 040 - Mac IIx" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac IIx. It includes a section on testing the installation.

Installation tools required

Complete the warranty card

About this manual
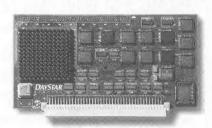
- **Chapter 5:** "Installing The Turbo 040 - Mac IIcx" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac IIcx. It includes a section on testing the installation.

- **Chapter 6:** "Installing The Turbo 040 - Mac IIsi" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac IIsi. It includes a section on testing the installation.

- **Chapter 7:** "Installing The Turbo 040 - Mac IIvx, IIvi, Performa 600" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac IIvx, IIvi and Performa 600. It includes a section on testing the installation.

- **Chapter 8:** "Installing The Turbo 040 - Mac IIci" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac IIci. It includes a section on testing the installation.

- **Chapter 9:** "Installing The Turbo 040 Software" covers the procedures for installing and using the software included with the Turbo 040. It also contains sections on troubleshooting and compatibility issues, should you experience any problems.

- **Appendix A:** "Performance Notes" discusses ways to increase your system's performance.

- **Appendix B:** "Product Support" includes the product specifications, warranty and instructions for returning the Turbo 040 for service.

Getting Started

Please read all of the instructions before you start the installation procedure. The Quick Installation Reference is designed for those who have experience installing DayStar accelerator boards in specific Macintoshes. Since all installations vary, we recommend that the full set of installation instructions be followed the first time you install a Turbo 040.

QuadControl

Note: Your Turbo 040 may look slightly different than the one pictured above. The installation and functionality is identical for all Turbo 040 cards.

Important: DayStar recommends you have the Turbo 040 installed by your dealer or an Apple Authorized Technician. If instructions are not explicitly followed, you can severely damage electronic circuitry or sustain serious personal injury.

The Danger of Static Electricity

WARNING: The DayStar Turbo 040 uses electronic components that are sensitive to static electricity. When handling and installing these boards, you must take care to prevent the components from being damaged by static currents. Always work in an area of low static electricity. Connect the anti-static bracelet to a grounded surface to prevent static discharge.

Precautions

Here is a brief list of precautions that help ensure proper grounding:

- **WEAR THE ANTI-STATIC WRIST STRAP**

- **DO NOT** attempt installation on a carpeted floor.

- **DO NOT** wear leather shoes — we recommend shoes with rubber soles.

- **DO NOT** attempt installation in an overly dry environment — spray mist the work area with water prior to installation.

- **DO NOT** wear silk or polyester clothing while doing the installation — we recommend cotton clothing.

- **REMOVE ALL JEWELRY** (rings, bracelets, watches, etc.) before installation.

If you are experienced in the installation of the Turbo 040 in the **Mac SE/30**, follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Flip power switch on/off 3 times.**

6. **Let the unit sit for 1 hour** to discharge.

7. **Remove the four screws and the cover.**

8. **Put on the anti-static wrist strap.**

9. **Remove any SE/30 expansion cards that may be present and insulate the brackets.**

10. **Install the Turbo 040 into the DayStar Adapter PDS and then install the combined boards into the PDS slot on the motherboard.**

11. **Re-assemble the cover** - Make sure all cables are properly connected.

12. **Test the installation** - Attach the power cord. Restart the Mac SE/30. You should hear the customary "BONG".

13. **Install QuadControl software** - Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

14. **Restart the Mac** - If any problems occur, see the troubleshooting section at the end of Chapter 9.

WARNING! DayStar recommends you have the Turbo 040 installed by your dealer or an Apple Authorized Technician. The Mac SE/30, when open, exposes the installer to a CRT vacuum tube which can implode or cause extreme electrical shock.

NOTE: An adapter is required for installing the Turbo 040 into the SE/30.

*CAUTION:
If you are not
experienced
at removing
processors,
follow the
detailed
instructions
in Chapter 3.*

*NOTE:
An adapter is
required for
installing the
Turbo 040
into the
Mac II.*

If you are experienced in the installation of the
Turbo 040 in the **Mac II**, follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk
   First Aid.

3. **Update your hard drives' driver soft-
   ware** with a version known to be compati-
   ble with the 68040. If you used a non-Apple
   formatter, make sure that blind transfers are
   disabled (see page 118 for more information).

4. **Remove all connectors and the
   power cord.**

5. **Remove the Mac II cover and disk tray.**

6. **Put on the anti-static wrist strap.**

7. **Remove the CPU and AMU chips** – Use
   the PGA puller provided with the adapter.

8. **Install the adapter board** – Align the
   adapter board's pins over the empty CPU
   and AMU socket. Press above the socket
   connection until the board is seated.

9. **Connect the Turbo 040 to adapter board.**

10. **Test the installation** – Attach the power
    cord. Restart the Mac II. Listen for the cus-
    tomary "BONG", then turn off.

11. **Replace the disk tray, cover** and make
    sure all cables are properly connect

12. **Install QuadControl software** – Boot the
    Mac, insert the DayStar disk and copy the
    QuadControl file to the System Folder.

13. **Restart the Mac** – If any problems occur,
    see the troubleshooting section at the end
    of Chapter 9.

If you are experienced in the installation of the Turbo 040 in the **Mac IIx**, follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Remove the Mac IIx cover and disk tray.**

6. **Put on the anti-static wrist strap.**

7. **Check to see if the CPU needs socketing** — If it needs a socket, contact DayStar Technical Support before proceeding.

8. **Remove the CPU** – Use the PGA puller provided with the adapter.

9. **Install the CPU onto the adapter board.**

10. **Install the IIx Adapter Board**– Align the Adapter over the empty CPU socket. Press above the socket until the board is seated.

11. **Connect the Turbo 040 to adapter board.**

12. **Test the installation** – Attach the power cord. Restart the Mac IIx. Listen for the customary "BONG", then turn off.

13. **Replace the disk tray, cover** and make sure all cables are properly connected.

14. **Install QuadControl software** – Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

15. **Restart the Mac** – If any problems occur, see the troubleshooting section at the end of Chapter 9.

Quick installation reference for the Mac IIx

CAUTION: It is possible that the processor is soldered to the motherboard and that the unit must to be sent to DayStar for socket installation. If you are not experienced at removing processors, follow the detailed instructions in Chapter 4.

NOTE: An adapter is required for installing the Turbo 040 into the Mac IIx. The adapter IIx must be part #000339. Earlier models did not support the Turbo 040.

CAUTION: The processor is most likely soldered into the motherboard and will require socket installation by DayStar. If you are not experienced at removing processors, follow the detailed instructions in Chapter 5.

NOTE: An adapter is required for installing the Turbo 040 into the Mac IIcx.

If you are experienced in the installation of the Turbo 040 in the **Mac IIcx**, follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Remove the Mac IIcx cover and remove the power supply.**

6. **Put on the anti-static wrist strap.**

7. **Check to see if the CPU needs socketing.** If it does, contact DayStar before proceeding. If it is has a socket, contact DayStar to have a PGA puller sent to you to remove the CPU.

8. **Install the adapter –** Align the adapter above the empty CPU socket. Slightly pull the adapter toward the front of the Mac to move the plastic power supply tab out of the way. Once aligned, gently press the center of the socket connection until it is firmly seated.

9. **Reinstall the power supply.**

10. **Connect the Turbo 040 to the adapter.**

11. **Test the installation –** Attach the power cord. Restart the Mac IIcx. Listen for the customary "BONG", then turn off.

12. **Replace the cover –** Make sure all cables are properly connected.

13. **Install QuadControl software –** Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

14. **Restart the Mac –** If any problems occur, see the troubleshooting section at the end of Chapter 9.

If you are experienced in the installation of the Turbo 040 in the **Mac IIsi,** follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Remove the Mac IIsi cover.**

6. **Put on the anti-static wrist strap.**

7. **Attach the metal shield to the adapter.** (NuBus Adapter only)

8. **Connect Turbo 040 to the adapter's middle connector.** If adding an additional card to the top slot, do so now. (If the additional card requires connections outside the IIsi, remove the case's cover panel.)

9. **Install the combined boards into the motherboard's PDS connector.**

10. **Insert the two screws through the chassis into the adapter's metal shield.** (NuBus Adapter only)

11. **Test the installation** – Attach the power cord. Restart the Mac IIsi. Listen for the customary "BONG", then turn off.

12. **Replace the cover** – Make sure all cables are properly connected.

13. **Install QuadControl software** – Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

14. **Restart the Mac** – If any problems occur, see the troubleshooting section at the end of Chapter 9.

Quick installation reference for the Mac IIsi

CAUTION: The Turbo 040 should not be installed into other Mac IIsi PDS adapters. Only DayStar adapters provide the correct pin configuration.

NOTE: An adapter is required for installing the Turbo 040 into the Mac IIsi.

**Quick
installation
reference
for the
Mac IIvx, IIvi,
Performa
600**

If you are experienced in the installation of enhancement boards for the **Mac IIvi, IIvx or Performa 600**, follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Remove the Mac cover.**

6. **Put on the anti-static wrist strap.**

7. **If present, remove any card from the accelerator slot.**

8. **Install the Turbo 040** - Connect the Turbo 040 to the accelerator slot.

9. **Test the installation** – Attach the power cord. Restart the Mac. Listen for the customary "BONG", then turn off.

10. **Replace the cover** – Make sure all cables are properly connected.

11. **Install QuadControl software** – Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

12. **Restart the Mac** – If any problems occur, see the troubleshooting section at the end of Chapter 9.

*NOTE:
Some
Turbo 040's
require an
adapter to
support the
IIvi, IIvx and
Performa 600.
If your Turbo
040 came with
an adapter,
follow the
instructions
that came
with the unit.*

If you are experienced in the installation of enhancement boards for the **Mac IIci,** follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Prepare the Mac - Remove all connectors and the power cord. Remove the Mac cover.**

5. **Put on the anti-static wrist strap.**

6. **Remove any cache cards** - Remove Apple or other third party cache card from cache connector slot, if any.

7. **Install the Turbo 040 -** Connect the Turbo 040 to the cache connector slot.

8. **Test the installation** – Attach the power cord. Restart the Mac. Listen for the customary "BONG", then turn off.

9. **Replace the cover** – Make sure all cables are properly connected.

10. **Install QuadControl software** – Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

11. **Restart the Mac** – If any problems occur, see the troubleshooting section at the end of Chapter 9.

Removing the Turbo 040

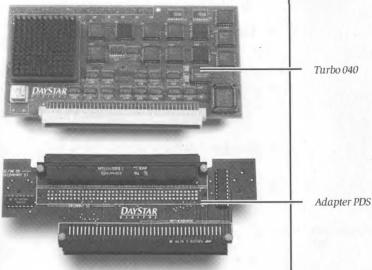If you must remove the Turbo 040, follow the instructions below:

1. Remove the QuadControl software from the Control Panels Folder.

2. Follow the "Quick Installation Instructions" for opening your particular Mac.

3. Remove the Turbo 040 from either your motherboard (Mac IIci, IIvi, IIvx and Performa 600) or the adapter (all other Macs). This concludes IIci, IIvi, IIvx and Performa 600 removal.

4. Remove the adapter card from the motherboard socket (Mac II, IIx and IIcx) or the motherboard connector (Mac SE/30 and IIsi). This concludes Mac SE/30 and IIsi removal.

5. Replace the CPU chip (and AMU chip for the Mac II) by aligning pin 1 on the chips with pin 1 on the appropriate sockets on the motherboard. (The gold Y-line is pin 1 on the CPU. The raised bump represents pin 1 on the AMU. The white dots on the motherboard sockets represent its pin 1s).

6. Gently press the center of the chips until they are fully seated into the sockets. This concludes II, IIx and IIcx removal.

Installing The Turbo 040 - Mac SE/30

You will need both the Turbo 040 (SE/30 com-
patible version) and the Adapter SE/30.

Turbo 040

Adapter PDS

**DayStar recommends you have the
Turbo 040 installed by your dealer or
an Apple Authorized Technician. The
Mac SE/30, when open, exposes the
installer to a CRT vacuum tube which
can implode or cause extreme electri-
cal shock.**

WARNING!

Installation of the DayStar Turbo 040 was
designed to be easy. You must, however, take
certain precautions:

**Prepare the
Mac SE/30
for
installation**

1. **Back up all hard drives** before beginning
   the installation.

2. **Check your hard drives** with Apple's Disk
   First Aid.

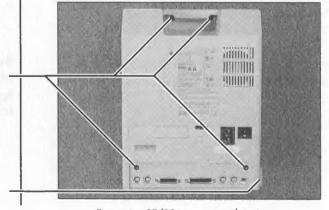3. **Update your hard drives' driver soft-ware** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Turn off the Macintosh SE/30** and remove the power cord and all accessory cables from the back of the Macintosh.

5. **Flip the power switch** on the rear of the Macintosh SE/30 three times to drain the power supply.

6. **Let the machine sit for 1 hour** so that the CRT screen's electrical charge can discharge.

7. **Place the Macintosh SE/30** on an unob-structed flat work area with the front of the Macintosh facing down on a soft surface so the screen is not scratched.

Begin the installation

1. If you have installed the Reset switch or Programmer's switch, remove it.

2. Using the Torx-like screwdriver included with the SE/30 adapter, remove the four cover screws on the rear of the Mac.
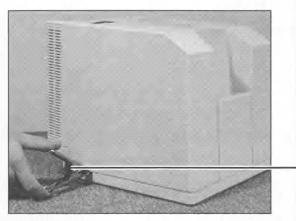

Four screws

Reset switch

Figure 1 – SE/30 cover screw locations

3. Place the case separating tool into the case's gap and carefully apply pressure to loosen the case's rear from the front of the computer. You will need to perform this all the way around the case before it will come apart. With the case open, remove the aluminum Radio Frequency shield.

Case separation tool

Figure 2 – Separating SE/30 case halves

4. Carefully place the Macintosh back on its bottom, being certain not to make contact with the CRT or power supply.

CRT

PDS Connector

Power Supply

Figure 3 – Macintosh SE/30 opened

5. Locate the mounting brackets on the Macintosh SE/30's chassis.
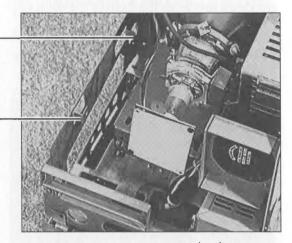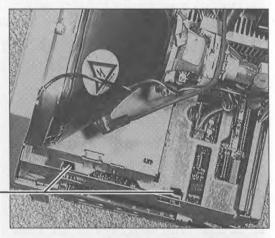
Front Bracket

Rear Bracket

Figure 4 – Locating mounting brackets

6. Put on the anti-static wrist strap.

Insulating the brackets

7. Install the electrical tape included with your adapter to the ends of the front and rear brackets.

Electrical tape installed

Figure 5 – Brackets insulated for installation

1. Align the Turbo 040 card with the included adapter board. Squeeze the connectors together until the board is fully seated.
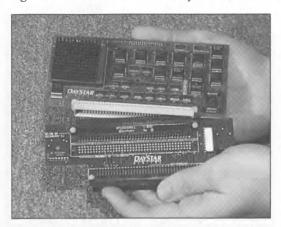
Figure 6 – Connecting Turbo 040 to Adapter

2. Carefully maneuver the combined board over the PDS slot on the Macintosh SE/30's motherboard.
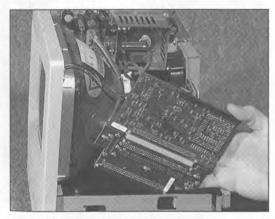
Figure 7 – Maneuvering combined boards

3. When the combined board is aligned over the motherboard's PDS slot, gently press down until it is fully seated.
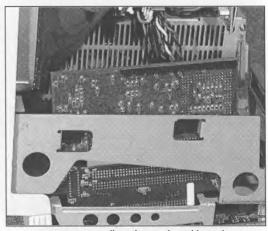

Figure 8 – Installing the combined boards

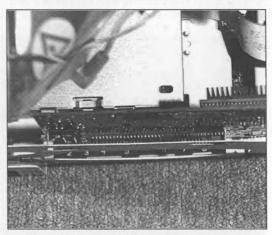4. The Turbo 040 is now installed.

Figure 9 – Turbo 040 installed

5. Place the Macintosh back on its face and replace the metal shield and cover. Do not fully tighten the screws until after testing the installation.
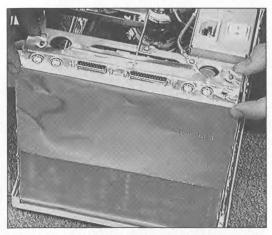

Figure 10 – SE/30 on face replacing shield

Please read all of this section before you test the installation.

Plug the power cord into the back of the Macintosh SE/30. Turn the Macintosh on. You should hear the customary "BONG". If you do not hear the BONG, go to the next page.

YES! I hear the "BONG".

1. Turn the power off and remove the power cord from the Mac.

2. Tighten the cover screws.

3. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the Turbo 040 Software."

Testing the installation

NO! I DO NOT hear the "BONG".

There is no response when the Macintosh SE/30 is turned on.
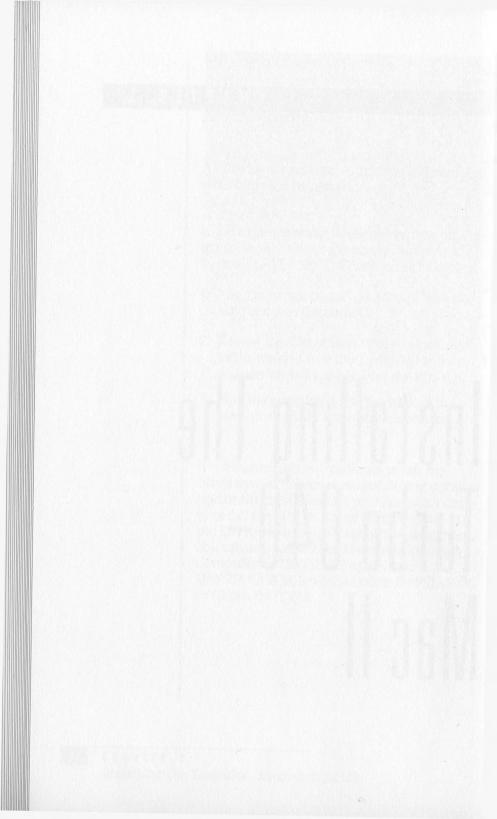
<div align="center">or</div>

A different sound (the failure tone) is heard when power is turned on.

If you experience any of the above, turn off the machine and remove the power cord from the back of the Mac SE/30. Then, do the following:

1. Flip the switch on and off 3 times. Wait one hour (for it to discharge).

2. Review the instructions. Verify proper installation, making sure the Turbo 040 and the Adapter are fully seated over the PDS slot.

3. Plug the power cord into the back of the Macintosh SE/30 and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544, AppleLink: DAYSTAR.TECH, America Online: DAYSTAR OL or GEnie: DAYSTAR.
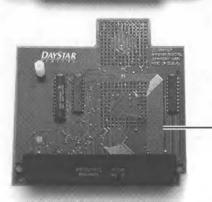
Installing The Turbo 040 - Mac II

You will need both DayStar's Turbo 040 (Mac II compatible version) and the Adapter II.

Turbo 040

Adapter II

Installation of the DayStar Turbo 040 was designed to be easy. You must, however, take certain precautions:

Prepare the Macintosh II for installation

1. **Back up your hard drive** before beginning the installation.

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple for- matter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Turn off the Macintosh II** and remove the AC power cord and all accessory cables from the back of the Macintosh.

5. **Press the power switch** on the right rear of the Mac three times to drain the power.

6. **Place the Macintosh II** on an unobstructed flat work area with the front of the Macintosh facing you.

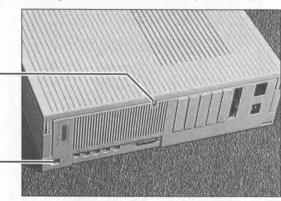1. Using a small Phillips screwdriver, remove the single screw in the rear of your Mac.

remove screw from back of case

power switch

Figure 11 – Rear view of the Macintosh II

2. Firmly depress the two latches on both sides of the back cover while lifting the cover from the Macintosh. Note: This procedure is detailed in the Apple Macintosh II Owner's Guide.
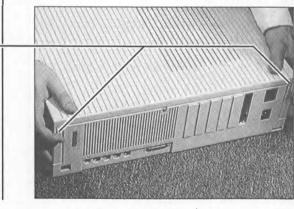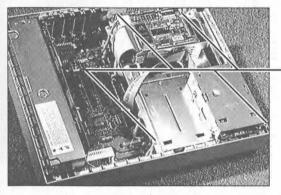
depress latches and lift top corners

Figure 12 - Opening the cover

3. Remove the screw on each corner of the disk tray (total of 4) that attach the tray to the Macintosh II. Be careful not to drop the screws into the machine. Place the screws in a safe place so they can be replaced once the installation is complete.
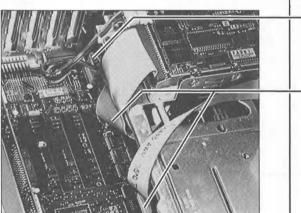
remove four
phillips head
screws

Figure 13 - View of the disk tray

4. Find where the disk drive cables connect to the motherboard. You must put them back in the same place. Unplug the floppy disk drive cable. Unplug the hard disk cable by swinging the two latch locks outward on the hard drive connector. Detach the hard drive's power plug from the motherboard.

Removing the drive tray

disconnect
power cable
from mother-
board

disconnect
ribbon cables
from mother-
board

Figure 14 - View of the cables

Installing The Turbo 040 - Macintosh II

5. Remove the disk tray and put it in a safe place. The motherboard is now fully exposed.

Figure 15 – View of the motherboard

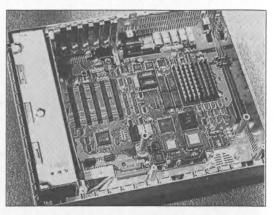6. Put on the anti-static wrist strap.

Installing SIMMs

If you are installing memory modules (SIMMs), you should do so at this time. With the drive tray removed, motherboard SIMMs can be easily accessed.

You are now ready to proceed with the installation of the Turbo 040 for the Mac II.

Before installing the DayStar Turbo 040, you must remove the original Macintosh MC68020 CPU chip and AMU. (Some Mac IIs have a PMMU instead of an AMU. Follow the same procedure for either chip.) Find the Pin Grid Array (PGA) puller for removing these chips in the Mac II adapter box.
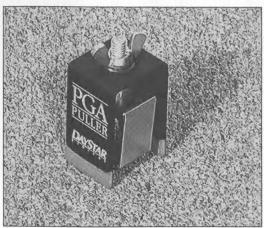
Figure 16 – PGA puller assembled

1. Remove the wing nut from the top of the PGA puller. Separate the puller into three parts: the outer tool, the inner tool and the wing nut.

inner tool

outer tool

wing nut
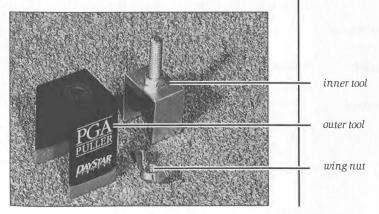
Figure 17 – PGA puller disassembled

2. Locate the 68020 chip and AMU chip on the lower right front of the Macintosh II motherboard. The 68020 chip is marked MC68020. The AMU is a black chip with multiple markings.

AMU chip

68020 (CPU) chip

Figure 18 – 68020 chip and AMU chip

3. From the side of the CPU, gently slide the inner tool over the MC68020 chip. Be sure that the teeth of the inner tool are between the CPU and the socket and NOT between the socket and the motherboard.

68020 (CPU) chip

CPU socket

motherboard

Figure 19 – Inner tool sliding over the 68020 chip

Installing The Turbo 040 – Macintosh II

4. While gently pressing the sides of the tool inward, slowly slide it until the teeth of the tool are firmly seated under the lip of the chip.

Figure 20 – Inner tool over processor

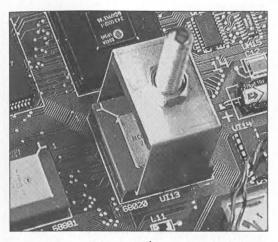5. At a 90 degree angle, place the outer tool over the inner tool that is seated on the chip. The tool should rest on the motherboard and not on any other chips. Put the wing nut on the threaded piece.
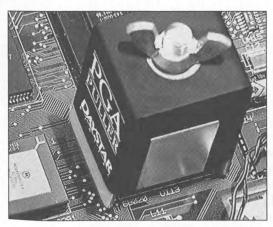

Figure 21 – Outer tool over processor

6. While maintaining gentle pressure on the sides of the inner tool, slowly turn the wing nut clockwise. This lifts the CPU from its socket evenly.
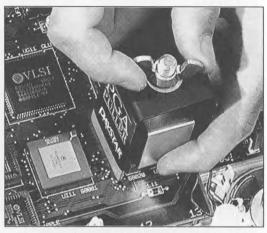
Figure 22 – Removing the 68020 chip

7. Put the CPU in a safe place so that you may reinstall it later if necessary.

   Tip: After you install the Turbo 040, use the protective foam you will be removing from the adapter board to protect the pins on your CPU and AMU.

   Tip: Store the chips inside the Mac up in front of the motherboard. They will be easy to find if you ever need them. Do not allow any metal parts of the stored chips to make contact with the motherboard.

Removing the AMU chip

Repeat the process to remove the black AMU chip which is located above the 68020 processor socket (see Figure 18 on page 42). When placing the inner tool over the AMU chip, be sure that the teeth of the tool are between the AMU and the socket and NOT between the socket and the motherboard.

1. Remove the protective foam from the adapter's pins. The adapter board contains two sets of square pins that connect the Mac II Adapter to the CPU and AMU sockets on the Mac II motherboard.

2. Locate the CPU and AMU sockets. This is where the adapter board will be installed.

AMU socket

CPU socket

speaker
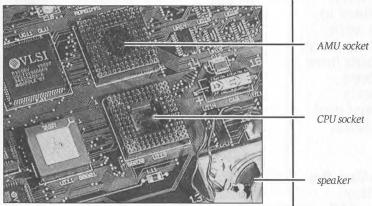
Figure 23 – CPU and AMU removed from sockets

3. Orient the adapter board so that the pins on the adapter align precisely with the motherboard CPU and AMU sockets. The adapter should be positioned so that the 120 pin connector is toward the front of the machine.

align pins with sockets
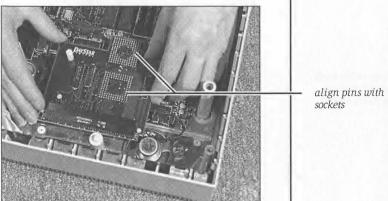
Figure 24 – Aligning the adapter board

4. Gently press above the center of the socket connections on the adapter board until it is fully seated.
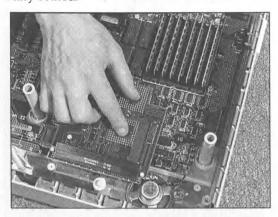
Figure 24a – Press on center of socket connections

Installing the DayStar Turbo 040

5. Position the Turbo 040 card with the included adapter board so that the Turbo 040 is face up and the connector is toward the front of the machine. Squeeze the connectors together with both hands until the board is fully seated.

Turbo 040 installs
at a 45° angle to
the motherboard
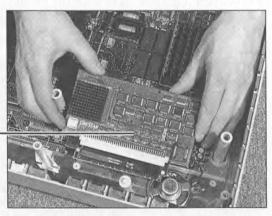
Figure 25 – Install Turbo 040

Installation of the Turbo 040 is complete. You must now test the installation and install the software.

Please read all of this section before you test the installation.

Plug the AC power cord into the back of the Macintosh. Press the power switch on the back of the Macintosh. You should hear the customary "BONG". If you do not hear the "BONG", go to the next page.

YES! I hear the "BONG".

1. Turn the power off and remove the power cord from the Mac.

2. Insert the floppy disk drive cable, hard disk cable and power connector into the appropriate sockets on the motherboard. Reinstall the disk drive tray by placing the tray back on its posts. Replace the four screws.

3. Replace the case cover and screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the Turbo 040 Software."

NO! I DO NOT hear the "BONG".

There is no response when the Macintosh II is turned on.

or

A different sound (the failure tone) is heard when power is turned on.

If you experience any of the above, remove the power cord from the back of the Mac II. Then, do the following:
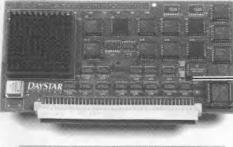
1. Review the instructions and verify proper installation. Then,

   · Squeeze the Turbo 040 and adapter board together.

   · Push down on the Turbo 040 assembly with your fingers in the center of the CPU and AMU sockets.

2. Plug the power cord into the back of the Macintosh II and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544, AppleLink: DAYSTAR.TECH, America Online: DAYSTAR OL or GEnie: DAYSTAR.

Installing The Turbo 040 – Mac IIx

You will need both DayStar's Turbo 040 (Mac IIx compatible version) and the Adapter IIx.

Turbo 040
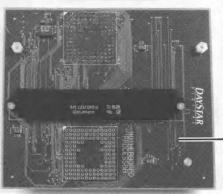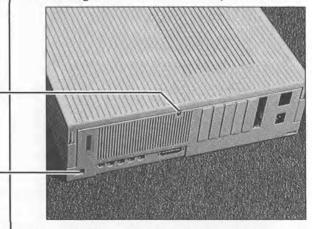
NOTE: The adapter IIx must be part #000339. Earlier models did not support the Turbo 040.

Adapter IIx

Installation of the DayStar Turbo 040 was designed to be easy. You must, however, take certain precautions:

Prepare the Macintosh IIx for installation

1. **Back up your hard drive** before beginning the installation.

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Turn off the Macintosh IIx** and remove the power cord and all accessory cables from the back of the Macintosh.

5. **Press the power switch** on the right rear of the Mac three times to drain the power.

6. **Place the Macintosh IIx** on an unobstructed flat work area with the front of the Macintosh facing you.

1. Using a small Phillips screwdriver, remove the single screw in the rear of your Mac.

remove screw from back of case

power switch

Figure 26 – Rear view of the Macintosh IIx

2. Firmly depress the latches on both sides of the back cover while lifting the cover from the Macintosh. NOTE: This procedure is detailed in the Apple Owner's Guide.

depress latches and lift top corners
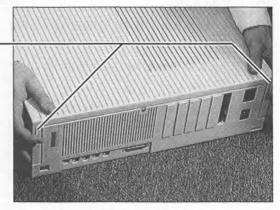
Figure 27 – Opening the cover

3. Remove the screw on each corner of the disk tray (total of 4) that attach the tray to the Macintosh IIx. Be careful not to drop the screws into the machine. Place the screws in a safe place so they can be replaced once the installation is complete.
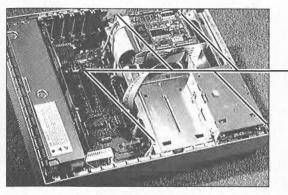
Figure 28 – View of the disk tray

remove four phillips head screws

4. Find where the disk drive cables connect to the motherboard. You must put them back in the same place. Unplug the floppy disk drive cable. Unplug the hard disk cable by swinging the two latch locks outward on the hard drive connector. Detach the hard drive's power plug from the motherboard.

Removing the drive tray
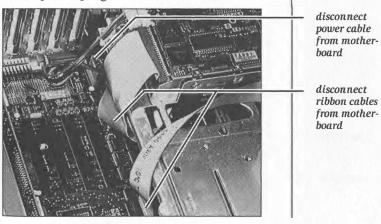
Figure 29 – View of the cables

disconnect power cable from motherboard

disconnect ribbon cables from motherboard

5. Remove the disk tray and place it in a safe location. The motherboard will be fully exposed.
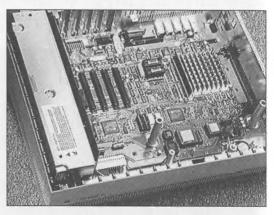
Figure 30 – View of the motherboard

6. Put on the anti-static wrist strap.

Installing SIMMs

If you are installing memory modules (SIMMs), you should do so at this time. With the drive tray removed, motherboard SIMMs can be easily accessed.

You are now ready to proceed with the installation of the Turbo 040 for the Mac IIx.

Before installing the DayStar Turbo 040, the original Macintosh MC68030 CPU chip must be removed. DayStar has provided a Pin Grid Array (PGA) Puller for removing these chips. (Important: See "Inspecting the CPU chip" section on page 69 for examples of Soldered and Socketed CPU chips.)
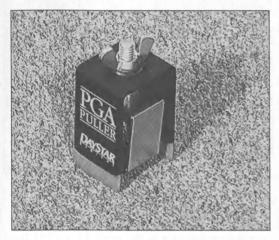
Figure 31 – PGA puller assembled

1. Remove the wing nut from the top of the PGA Puller, separating it into three parts: the outer tool, the inner tool and the wing nut.

inner tool

outer tool

wing nut
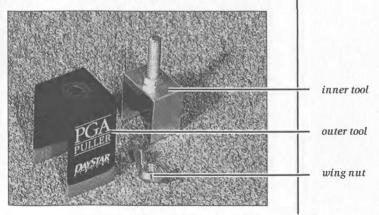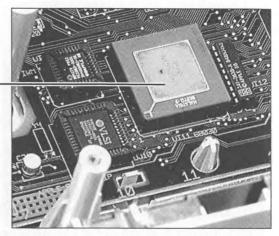
Figure 32– PGA puller disassembled

Removing the CPU chip

NOTE: Some Mac IIx CPUs are soldered to the motherboard. Be sure to check your chip before proceeding. If this is the case, contact DayStar Technical Support for information on how to proceed.

Installing The Turbo 040 – Macintosh IIx

2. Locate the CPU on the lower right front portion of the Macintosh IIx motherboard. The CPU is marked MC68030 (plus additional characters).

68030 (CPU) chip

Figure 33 – 68030 location

3. Gently slide the inner tool over the MC68030 processor, starting at the rear of the CPU. Be sure that the teeth of the inner tool are between the CPU and the socket and NOT between the socket and the motherboard.
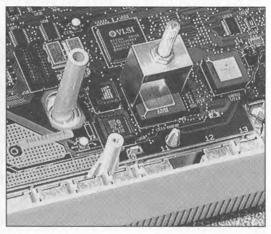
Figure 34 – Inner tool sliding over the 68030 processor

4. While gently pressing the sides inward, slowly slide the tool until the teeth of the tool are firmly seated under the lip of the CPU.
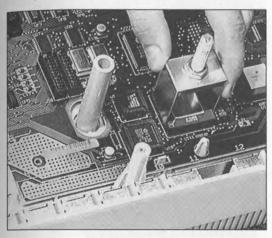
Figure 35 – Inner tool over processor

5. Place the outer tool at a 90 degree angle over the inner tool. The tool should rest on the motherboard and not on any other chips. Start turning the wing nut onto the threaded piece.
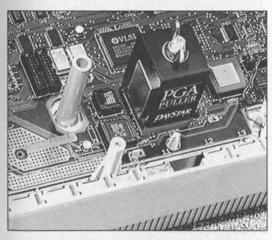
Figure 36 – Outer tool over processor

6. While maintaining gentle pressure on the sides of the inner tool, slowly turn the wing nut clockwise. This will lift the CPU from its socket evenly.
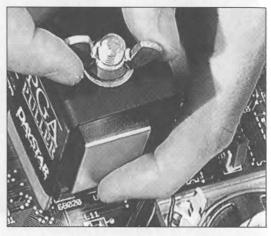
Figure 37 – Removing the processor

Preparing the Turbo 040

NOTE: The adapter IIx must be part #000339. Earlier models do not support the Turbo 040. Contact DayStar Customer Service if you need to exchange adapters.

7. Once removed, install the CPU into the adapter socket. Align pin 1 on the CPU (gold Y-line) with pin 1 of the socket (white triangle). To protect the adapter's pins, the installation should be done on the edge of a flat surface, with the pins over hanging as shown.

Figure 38 – Installing motherboard CPU onto adapter

8. Install the provided rubber pad onto the top of the speaker.

Rubber pad

Figure 39 – Placing rubber pad on speaker

9. Remove the protective foam from the adapter's pins on the back of the board.

10. Install the adapter board so that the pins on the adapter align precisely with the motherboard CPU socket. Gently press above the center of the socket connections of the board until it is fully seated.
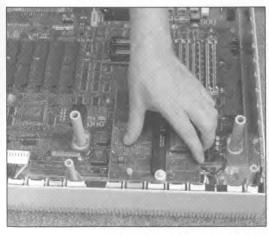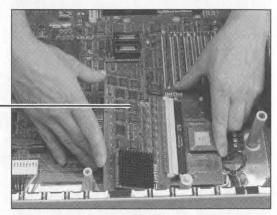
Figure 40 – Installing adapter

Installing the DayStar Turbo 040

NOTE: You should only feel light to medium resistance when installing the adapter. If you have to push with extreme force, the pins have not been properly aligned and will bend.

Installing The Turbo 040 - Macintosh IIx

11. Align the Turbo 040 card with the included adapter board. Squeeze the connectors together with both hands until the board is fully seated.

Figure 41 – Pressing down on adapter

Installation of the Turbo 040 assembly is now complete. You are now ready to proceed with testing and software installation.

Turbo 040 installs at a 45° angle to the motherboard

Please read all of this section before you test the installation.

Plug the power cord into the back of the Macintosh. Press the power switch on the back of the Macintosh. You should hear the customary "BONG". If you do not hear the "BONG", go to the next page.

YES! I hear the "BONG".

1. Turn the power off and remove the power cord from the Mac.

2. Insert the floppy disk drive cable, hard disk cable and power connector into the appropriate sockets on the motherboard. Reinstall the disk drive tray by placing the tray back on its posts. Replace the four screws.

3. Replace the case cover and screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the Turbo 040 Software."

NO! I DO NOT hear the "BONG".

There is no response when the Macintosh IIx
is turned on.

or

A different sound (the failure tone) is heard
when power is turned on.

If you experience any of the above, remove the
power cord from the back of the Mac IIx. Then,
do the following:
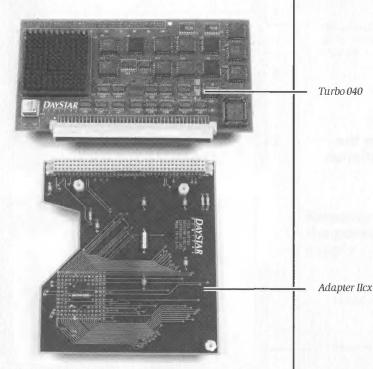
1. Review the instructions and verify proper
   installation. Then,

   · Squeeze the Turbo 040 and adapter board
     together.

   · Push down on the Turbo 040 assembly
     with your fingers in the center of the CPU
     socket.

2. Plug the power cord into the back of the
   Macintosh IIx and restart as before.

If the startup process continues to fail, the
board may have been damaged during installa-
tion or shipment. Contact your computer deal-
er or call DayStar Technical Support (9 am to 6
pm EST) at 404-967-2077 for further assistance.
You can also contact DayStar online through
CompuServe: 75300,1544, AppleLink:
DAYSTAR.TECH, America Online: DAYSTAR OL
or GEnie: DAYSTAR.

Installing The Turbo 040 – Mac IIcx

You will need both DayStar's Turbo 040 (IIcx version) and the Adapter IIcx.

Turbo 040

Adapter IIcx

Installation of the DayStar Turbo 040 was designed to be easy. You must, however, take certain precautions:

1. **Back up your hard drive** before beginning the installation.

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Turn off the Macintosh IIcx** and remove the power cord and all accessory cables from the back of the Macintosh.

5. **Press the power switch** on the right rear of the Mac three times to drain the power supply.

6. **Place the Macintosh IIcx** on an unobstructed flat work area with the front of the Macintosh facing you.

Begin the installation

1. Using a small Phillips screwdriver, remove the single screw in the rear of your Macintosh IIcx.

remove screw from back of case

power switch
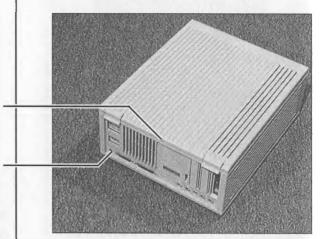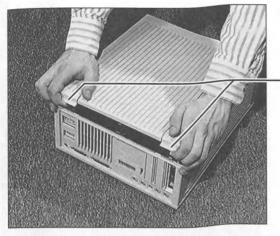
Figure 42– Rear view of the Macintosh IIcx

2. Lift the latches on both sides of the back cover up and out while raising the cover from the Macintosh. NOTE: This procedure is detailed in the Apple Macintosh IIcx Owner's Guide.

Installing The Turbo 040– Macintosh IIcx

lift out and up on latches and raise top

Figure 43 – Opening the cover

3. Remove the power supply from the Macintosh IIcx using the Power Supply Unlocking Tool.

Removing the power supply

rest point of unlocking tool between power supply and latch
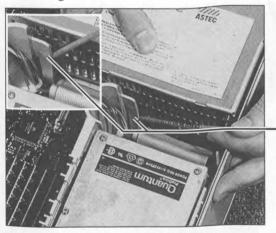
Figure 44 – View of power supply

Installing The Turbo 040- Macintosh IIcx

4. Gently rock the power supply with your hand under the power supply to remove it from the Macintosh IIcx.
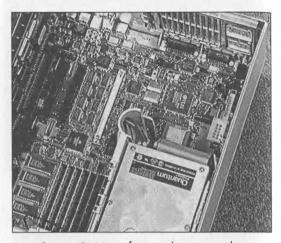
Figure 45 – View of removed power supply

5. Place the power supply in a safe location. The 68030 processor will be fully exposed.

68030 processor
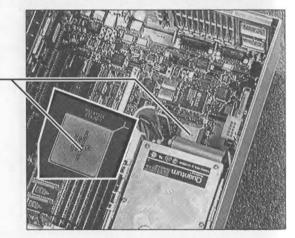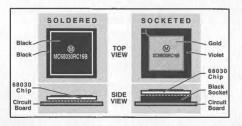
Figure 46 – View of 68030
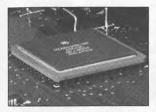
6. Put on the anti-static wrist strap.

You are now ready to proceed with the installation of the Turbo 040.

Before installing the DayStar Turbo 040 for the Macintosh IIcx, the original Macintosh MC68030 CPU chip must be removed.

Since the Turbo 040 requires a socket for installation, you will need to verify which type of CPU chip you have. DayStar can install a socket if your CPU is soldered. Generally, black CPUs are soldered, but check from the side to be sure of your CPU type. If you are not sure, call 404-967-2077.

(A) Picture of Soldered CPU chip
(Note: Pins soldered directly into board)

(B) Picture of Socketed CPU chip
(Note: Black plastic socket- pins not visible)

Figure 47 – Examples of CPU types

Due to earlier problems of customers attempting to remove soldered chips, the PGA puller was not shipped with this package. If you have verified that your Mac has a socketed chip, contact DayStar Technical Support to have a PGA puller sent to you.

Inspecting the CPU chip

NOTE: Most Mac IIcx's have a soldered (not socketed) CPU chip. Before proceeding, contact DayStar Technical Support at 404-967-2077 for information on how to proceed.

Removing the CPU chip

1. Remove the wing nut from the top of the PGA Puller, separating it into three parts. These parts will be referred to as the inner tool, the outer tool and the wing nut.

assembled PGA puller

inner tool

outer tool

wing nut
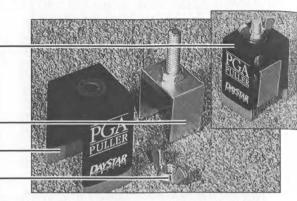
Figure 48 – PGA puller

2. Locate the CPU in the area of the Macintosh motherboard which was under the power supply. The CPU is marked MC68030.

68030 processor
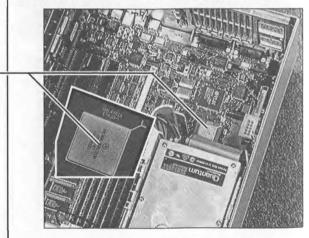
Figure 49 – 68030 location

3. Gently slide the inner tool over the MC68030 processor, beginning at the rear of the CPU. Be sure that the teeth of the inner tool are between the CPU and the socket and NOT between the socket and the motherboard.
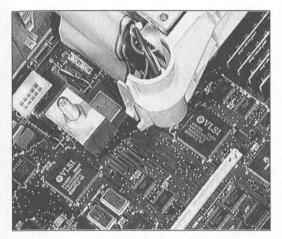
Figure 50 – Inner tool sliding over the 68030 processor

4. While gently pressing its sides inward, slowly slide the tool until the teeth of the tool are firmly seated under the lip of the CPU.
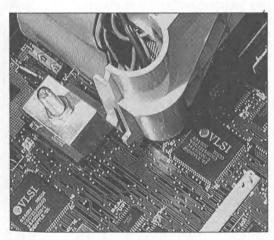
Figure 51– Inner tool over processor

5. Place the outer tool at a 90 degree angle over the inner tool. The tool should rest on the motherboard, and not on any other chips. Start turning the wing nut onto the threaded piece.
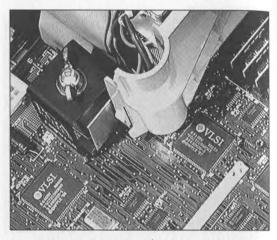
Figure 52 – Outer tool over processor

6. While maintaining gentle pressure on the sides of the inner tool, slowly turn the wing nut clockwise. This will lift the CPU from its socket evenly.
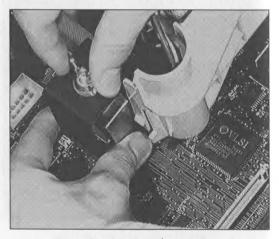
Figure 53 – Removing the processor

7. Put the CPU in a safe place so that you may reinstall it later if necessary.

Tip: After you install the Turbo 040, use the protective foam you will be removing from the adapter board to protect the pins on your CPU.

Tip: Store the CPU inside the Mac, up in front of the motherboard – it's out of the way and easy to find if you ever need it. Also, do not allow any metal parts of the stored chips to contact the motherboard.

Installing the adapter board

1. The adapter board contains a square set of pins that connect the Turbo 040 to the processor socket on the Mac IIcx motherboard. Remove the protective foam from the adapter's pins.

2. Align the adapter's notch with the crescent section of the drive assembly. In order to align the adapter's pins with the motherboard CPU socket, you must slightly pull the adapter towards the front of the machine. This will push the plastic power supply tab out of the way.
Make sure that the adapter's pins are above the CPU socket when performing this alignment.

drive assembly

tab

crescent
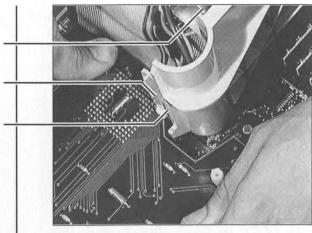
Figure 54 – Aligning the adapter board

NOTE:
You should only feel light to medium resistance. If you have to push with extreme force, the pins have not been properly aligned and will bend.

3. With the adapter's pins aligned with the CPU socket, gently press above the center of the socket connection on the adapter board until it is fully seated. When the adapter is fully seated, the power supply's locking tab should spring back into place above the adapter.
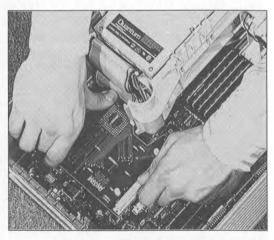
Figure 55 – Installing the adapter board

Installing The Turbo 040- Macintosh IIcx

4. Reinstall the Macintosh IIcx power supply.

5. Align the Turbo 040 card with the installed adapter board. Squeeze the connectors together with both hands until the board is fully seated.
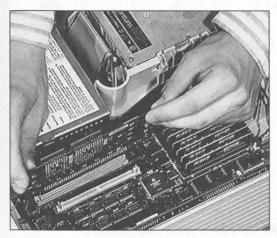
Figure 56 – Connecting the Turbo 040 to the adapter
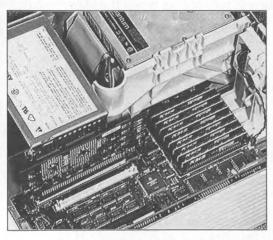
Figure 57– The Turbo 040 installed

Installation of the Turbo 040 assembly is now complete. You are ready to proceed with testing and software installation.

Installing the DayStar Turbo 040

NOTE: The Turbo 040's heatsink may touch the power supply. This is normal.

Testing the installation

Please read all of this section before you test the installation.

Plug the power cord into the back of the Macintosh IIcx. Turn the Macintosh on. You should hear the customary "BONG". If you do not hear the "BONG", go to the next page.

YES! I hear the "BONG".

1. Turn the power off and remove the power cord from the Mac.

2. Replace the case cover and screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the Turbo 040 Software."

NO! I DO NOT hear the "BONG".

There is no response when the Macintosh IIcx is turned on.

or

A different sound (the failure tone) is heard when power is turned on.

If you experience any of the above, remove the power cord from the back of the Mac IIcx. Then, do the following:

1. Review the instructions and verify proper installation. Then,

   · Squeeze the Turbo 040 and adapter board together.

   · Remove the power supply.

· Push down on the adapter with your finger in the center of the CPU socket.

2. Reinstall the power supply. Plug the power cord into the back of the Macintosh IIcx and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544, AppleLink: DAYSTAR.TECH, America Online: DAYSTAR OL or GEnie: DAYSTAR.

Installing The Turbo 040 - Mac IIsi

You will need both DayStar's Turbo 040 and either the Adapter IIsi, DualPort IIsi or Adapter IIsi - NuBus. The Adapter IIsi and the DualPort IIsi provide a pass-through PDS (processor direct slot) for an additional PDS card. The Adapter IIsi - NuBus provides a NuBus connector for also adding a NuBus card.

Note: If you own a Radius Hard Pivot PDS video card, you should use the DayStar Adapter PDS. Contact DayStar for further information.

Turbo 040

Adapter IIsi or DualPort IIsi

Adapter IIsi - NuBus

The installation of the DayStar Turbo 040 was designed to be easy. You must, however, take certain precautions:

1. **Back up all hard drives**.

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Turn off the Macintosh IIsi** and remove the power cord and all accessory cables from the back of the Macintosh.

5. **Press the power switch** on the rear of the Macintosh three times to drain the power.

6. **Place the Macintosh IIsi** on an unobstructed flat work area with the front of the Macintosh facing toward you.

7. **Open the Macintosh IIsi case** (detailed in the Apple Macintosh IIsi Owner's Guide).

8. **Put on the anti-static wrist strap.**

9. **If you installed a hard drive** into your IIsi, the drive may have to be moved forward slightly in order to install the Turbo 040.

10. **Remove any existing PDS cards.**

Hard drive

SIMMs

ROM socket

IIsi PDS connector
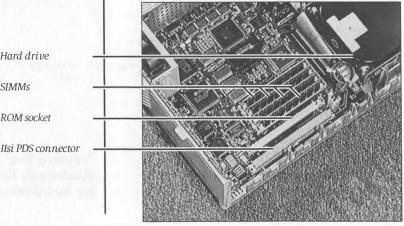
Figure 58 – View of the Macintosh IIsi

1. **(Adapter IIsi - NuBus only-)** Place the metal shield flat on your work surface with the four screw holes facing up. Position the adapter board over the four screw sockets with the slots facing up. The board only fits one way.

2. **(Adapter IIsi - NuBus only-) Place the four nylon washers on the Phillips head screws and** insert the screws through the board and into the shield's built-in nuts. Tighten the screws until you receive medium resistance and the board is firmly attached to the shield.

4 Phillips head screws
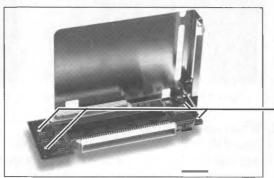
Figure 59 - Attaching the adapter to the metal shield

1. **If you are installing a PDS or NuBus board, align it** with the top slot. Squeeze the connectors together with both hands until the board is fully seated. Note: The Turbo 040 will ignore math chips on any other cards.

Installing an additional PDS or NuBus card
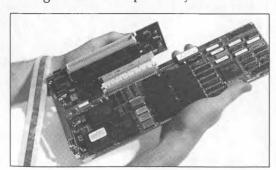
Figure 60 - Attaching a PDS or NuBus card

Warning: DO NOT plug any PDS boards into the board's center (cache) connector or IIci cache cards into the top (PDS) connector.

Installing the DayStar Turbo 040

IMPORTANT: Connect the Turbo 040 to middle slot ONLY.

Center slot (Adapter IIsi/ DualPort IIsi pictured)

1. Connect the Turbo 040 to the middle connector of the adapter. Note that the Turbo 040 will be facing up (it only fits one way).
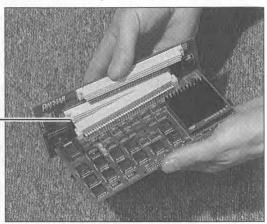
Figure 61 - Attaching the Turbo 040 to the adapter

2. **If you are installing a NuBus or PDS board that needs to access connections outside the IIsi (e.g., a video card), remove the cover panel** on the rear of the case.

3. **Holding the adapter and attached boards together, align the adapter** over the empty motherboard PDS connector. Gently push it into the slot until it is fully seated.
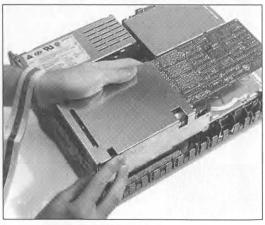
Figure 62 – Installing Turbo 040

4. **(Adapter IIsi - NuBus only-) Take the two thumb screws (with the large heads) and insert them** through the back of the Macintosh chassis and into the NuBus Adapter's metal shield.
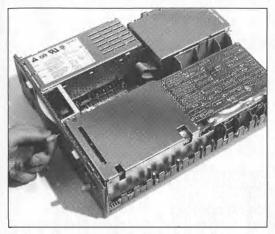
Figure 63 – Installing the thumb screws

Installation of the Turbo 040 assembly is now complete. You are ready to proceed with testing and software installation.

Check that all connections are tight. You are now ready to test the installation.

Testing the installation

Please read all of this section before you test the installation.

Plug the power cord into the back of the Macintosh. Turn the Macintosh on. You should hear the customary "BONG". If you do not hear the "BONG", go to the next page.

YES! I hear the "BONG".

1. Turn the power off and remove the power cord from the Mac.

2. Replace the case cover and screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the Turbo 040 Software."

NO! I DO NOT hear the "BONG".

There is no response when the Macintosh IIsi is turned on.

or

A different sound (the failure tone) is heard when power is turned on.
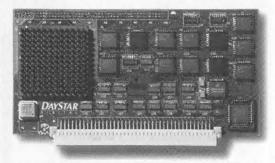
If you experience any of the above, remove the power cord from the back of the Mac IIsi. Then, do the following:

1. Review the instructions and verify proper installation. Then,

   · Squeeze the Turbo 040 and adapter board together.

   · Push down on the adapter to verify a good connection with the motherboard PDS socket.

2. Plug the power cord into the back of the Macintosh IIsi and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544, AppleLink: DAYSTAR.TECH, America Online: DAYSTAR OL or GEnie: DAYSTAR.

Installing The Turbo 040 - Mac IIvx, IIvi, Performa 600

No adapter is required for this installation. The Turbo 040 (IIvx, IIvi, Performa 600 compatible version) plugs directly into the accelerator slot on the Mac.

Turbo 040

The installation of the DayStar Turbo 040 was designed to be easy. You must, however, take certain precautions:

1. **Back up all hard drives** before beginning the installation.

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Turn off the Macintosh** and remove the power cord and all accessory cables from the back of the Macintosh.

5. **Press the power switch** on rear of the Macintosh three times to drain the power.

Installing the Turbo 040 in the Mac IIvx, IIvi, Performa 600

NOTE: Some Turbo 040's require an adapter to support the IIvi, IIvx and Performa 600. If your Turbo 040 came with an adapter, follow the instructions that came with the unit.

Prepare the Macintosh for installation

Installing The Turbo 040– Macintosh IIvx, IIvi, Performa 600

6. **Place the Macintosh** on an unobstructed flat work area with the front of the Macintosh facing toward you.

Installing the DayStar Turbo 040

1. **Open the Macintosh.** (This procedure is detailed in the Apple IIvx, IIvi or Performa 600 Owner's Guide).

Accelerator slot

NuBus slots

Figure 64– View of the Macintosh

2. Put on the anti-static wrist strap.

3. Locate the accelerator slot and remove any existing cards.

4. With the component side of the Turbo 040 facing the power supply, align the board's connector over the 120 pin connector on the motherboard. Gently push the card down until it is fully seated.
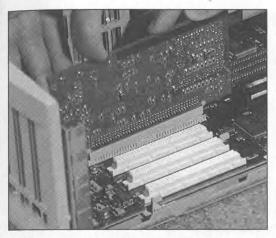
Figure 65 – Installing the Turbo 040

You have installed the Turbo 040. Now you must test the installation and install the software.

Please read all of this section before you test the installation.

Plug the power cord into the back of the Macintosh. Press the power switch on the back of the Macintosh. You should hear the customary "BONG". If you do not hear the "BONG", go to the next page.

YES! I hear the "BONG".

1. Turn the power off and remove the power cord from the Mac.

2. Replace the case cover and screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the Turbo 040 Software."

NO! I DO NOT hear the "BONG".

There is no response when the Macintosh is turned on.

or

A different sound (the failure tone) is heard when the power is turned on.
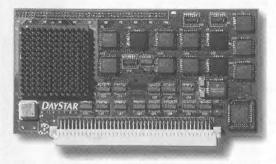
If you experience any of the above, remove the power cord from the back of the Mac. Then, do the following:

1. Review the instructions and verify proper installation. Then,

   · Check that the Turbo 040 is firmly seated in the accelerator slot.

2. Plug the power cord into the back of the Macintosh and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544, AppleLink: DAYSTAR.TECH, America Online: DAYSTAR OL or GEnie: DAYSTAR.

Installing The Turbo 040 – Macintosh IIci

No adapter is required for installing the Turbo
040 (Mac IIci compatible version) in the Mac
IIci. The Turbo 040 plugs directly into the
cache slot of the Mac.

Turbo 040

The installation of the DayStar Turbo 040 was
designed to be easy. You must, however, take
certain precautions:

1. **Back up all hard drives** before beginning
   the installation.

2. **Check your hard drives** with Apple's Disk
   First Aid.

3. **Update your hard drives' driver soft-
   ware** with a version known to be compati-
   ble with the 68040. If you used a non-Apple
   formatter, make sure that blind transfers are
   disabled (see page 118 for more information).

4. **Turn off the Macintosh** and remove the
   power cord and all accessory cables from
   the back of the Macintosh.

5. **Press the power switch** on rear of the
   Macintosh three times to drain the power.

Installing the Turbo 040 in the Mac IIci

Prepare the Macintosh IIci for installation

Installing The Turbo 040 – Macintosh IIci

6. **Place the Macintosh** on an unobstructed flat work area with the front of the Macintosh facing toward you.

1. **Open the Macintosh.** (This procedure is detailed in the Apple IIci Owner's Guide).

Power Supply

Cache Slot

ROM Connector

NuBus Slots

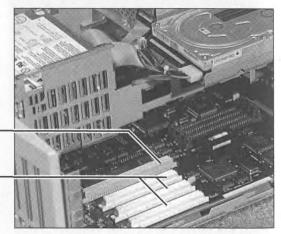*Figure 66 – View of the Macintosh IIci*

2. Put on the anti-static wrist strap.

3. Locate the cache slot and remove any existing cards.

4. With the component side of the Turbo 040 facing the power supply, align the board's connector over the 120 pin cache slot on the motherboard. Gently push the card down until it is fully seated.

Cache Slot
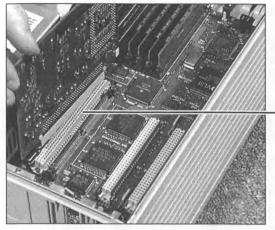
Figure 67 – Installing the Turbo 040

You have installed the Turbo 040. Make sure all connections are tight. You must now test the installation and install the software.

Please read all of this section before you test the installation.

Plug the power cord into the back of the Macintosh. Turn the Macintosh on. You should hear the customary "BONG". If you do not hear the "BONG", go to the next page.

YES! I hear the "BONG".

1. Turn the power off and remove the power cord from the Mac.

2. Replace the case cover and screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9 in the Turbo 040 manual, "Installing the Turbo 040 Software."

Testing the installation

NO! I DO NOT hear the "BONG".

There is no response when the Macintosh is turned on.

<div align="center">or</div>

A different sound (the failure tone) is heard when power is turned on.

If you experience any of the above, remove the power cord from the back of the Mac. Then, do the following:

1. Review the instructions and verify proper installation. Then,

   • Make sure the Turbo 040 is firmly seated in the cache slot.

2. If the failure tone was heard, make sure all of the SIMMs are properly installed.

3. Plug the power cord into the back of the Macintosh and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544, AppleLink: DAYSTAR.TECH, America Online: DAYSTAR OL or GEnie: DAYSTAR.

Installing The Turbo 040 Software

If you are using System software prior to 7.5, we recommend that you update your networking files for optimal networking performance.

Follow these steps to install Apple's Networking files onto the hard (startup) disk:

1. Start the Macintosh from the hard drive.

2. Insert the Network Software Installer disk into the floppy disk drive.

3. Run the Installer and restart your Mac.

Note: If you are using a networking card that does not use Apple's drivers and experience networking problems, contact the vendor for the latest driver for your card.

The QuadControl Control Panel must be installed to turn on PowerMath, AutoCache and the secondary cache. (See next page for benefits.)

Follow these steps to install the QuadControl file onto the hard (startup) disk:

1. Start the Macintosh from the hard drive.

2. Insert the DayStar disk into the floppy drive.

3. Copy the QuadControl file from the DayStar floppy disk to:

QuadControl

- *the System Folder* of your Startup hard drive if running system 6.x.

- *the Control Panels Folder* of your Startup hard drive if running System 7.x.

4. Restart the Mac. If the Macintosh does not restart from the hard disk, see the troubleshooting section at the end of this chapter.

Updating your networking software

Installing QuadControl

NOTE: Check the Last Minute Additions & Info file on the DayStar disk for late breaking news or changes.

To access the QuadControl software, select Control Panels from the Apple pull-down menu. Select or double click on the QuadControl icon. The following screen will appear:

NOTE: System 6.x users should have 32-bit Color QuickDraw installed to properly display QuadControl.

(Checked box means "on")
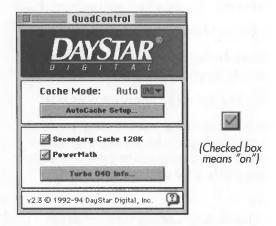
Figure 68 – QuadControl CDEV

Balloon Help - to make it easier to access Balloon Help, DayStar provides a button in QuadControl that turns Balloon Help on and off.

QuadControl allows you to choose between AutoCache and manual cache modes. The icon to the right of the cache mode in the CDEV displays the currently selected mode for caching.

Cache Mode: -

Enable AutoCache - When this mode is selected, the word "Auto" appears next to the icon and the current cache mode is shown. The 68040's cache mode is changed according to the settings in AutoCache setup for the currently-running applications. This allows easy use of some older applications that ordinarily don't run on 68040 equipped Macs.

Copy Back (040 Mode) - This mode pro-
vides the fastest performance, but is
incompatible with older applications that
don't support the 68040. When this mode
is selected, information is copied to the
internal 040 cache, then at a later time,
copied to motherboard memory.

Write Through (030 Mode) - This mode
slows down all currently open applica-
tions, but allows a lot of software that does
not work with the 68040 to run properly.
When this mode is selected, information is
copied straight through the internal 040
cache to motherboard memory.

Application Caching Off - This mode
drastically reduces performance of all
open applications, but allows most 68040
incompatible software to run on the
68040. Most applications do not require
this mode. When this mode is selected,
no application information is cached to
either the internal 040 cache or the sec-
ondary cache.

AutoCache Setup... - The icon to the left of
each application in the list is a pull-down
menu that allows you to select the cache
mode to be used when that application is
launched. The options for each application
include the three settings mentioned above:
040 Mode, 030 Mode and Application
Caching Off.

**AutoCache
Setup**
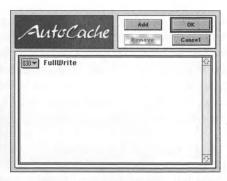
Figure 69– AutoCache controls

Add - Adds applications or desk accessories to the list using an "open" type dialog box. (System 6 users can add desk accessories by holding down the option key while selecting the Add button.)

Remove - Removes the application from the list.

Cancel - Leaves the list of applications unchanged.

OK - Saves changes to the list.

Secondary Cache Control

Secondary Cache 128K - Allows you to turn the 128K Static RAM cache on and off.

The capability to turn off the cache is provided. With the cache off, the Mac still runs at the accelerated clock speed, but performance is significantly reduced.

PowerMath

Note: PowerMath is not available on the Turbo 040i or if other enhanced SANE software such as RadiusMath is installed.

PowerMath (Turbo 040 only, not available on Turbo 040i) – Allows you to turn DayStar's PowerMath on and off. QuadControl provides two versions of PowerMath. The first, normal PowerMath, replaces Apple's SANE (Standard Apple Numeric Environment) routines, which do all floating point operations in software, with versions which use the math coprocessor. The second, Enhanced PowerMath, provides greater performance by decreasing the amount of overhead necessary to get to a coprocessor-based SANE routine. Enhanced PowerMath is functionally similar to Apple's Omega SANE, which was released with System 7.0.1. Both versions of PowerMath maintain Apple's high level of numerical accuracy.

Even though Enhanced PowerMath provides better performance, there may be rare cases where it may fail when normal PowerMath will work. For this reason, QuadControl's default setting has PowerMath turned on and Enhanced PowerMath off.

To enable Enhanced PowerMath, click on the PowerMath button so that PowerMath is on. Press OPTION and click on the PowerMath button. The text will change to Enhanced PowerMath, showing that Enhanced PowerMath is in operation.

Figure 70 - Enhanced PowerMath On

To disable Enhanced PowerMath press OPTION and click on the Enhanced PowerMath button. The text will change to PowerMath, showing that normal PowerMath is in operation.

The rule of thumb is that the OPTION-click sequence will change the current state of Enhanced PowerMath.

Turbo 040 Info

Turbo 040 Info provides important technical information for quick reference.

Figure 71 – Turbo 040 Info

Turbo 040 displays the speed of the Turbo 040 and the version number of the Turbo 040's ROM.

Supports the following machines: provides a complete list of which Macs your Turbo 040 supports. (If you wish to move your Turbo 040 to a Mac that is not listed here, see "Upgrading the Turbo 040" on page 127.)

Full Speed Memory Locking is Off/On displays the current setting for the 68040 Data Cache. (See "Advanced QuadControl Options" for more information on page 110.)

Memory is Locked tells you whether the motherboard memory has been locked. (See "Advanced QuadControl Options" for more information on page 110.)

Virtual Memory is On is displayed if you have turned Virtual Memory on in Apple's Memory Control Panel.

MacsBug Typing Fix is On is displayed if you have turned this feature on. (See "Advanced QuadControl Options" for more information on page 110.)

68040 Data Cache is Off is displayed if the data cache is disabled. Important: The data cache should only be off if you have Apple's A/ROSE software or a certain NuBus board installed that disables the data cache. (See "Advanced QuadControl Options" for more information on page 110.)

68040 Instruction Cache is Off is displayed if the instruction cache is currently disabled. Important: The instruction cache should only be off if you have an extension or control panel which has turned it off. If the cache is off, performance will be significantly decreased.

QuadControl can provide a display of your current system information. Press COMMAND-CONTROL and click on the DayStar logo. A dialog box similar to the one below will be displayed:

```
ROM Version: $17B
ROM Checksum: $97221136
AppleTalk Version: 57.4.128.0
Processor: 040
CPUFlag: 4
FPU Type: None
Machine Type: Macintosh II
MMU Type: '040 MMU
Physical RAM: 20MB
ROM Size: 262144 bytes
System Version: 7.1.0
Virtual Memory: Off
32-bit mode
Instruction Cache: On
Data Cache: On

Disk Spinup (0-31):  [31]

        [ Ok ]
```

Figure 72 - System Info

ROM Version: indicates the type of ROM installed in your machine.

ROM Checksum: differentiates between machines with the same ROM Version.

AppleTalk Version: the version of AppleTalk installed. It will display 0.0.0.0 if AppleTalk is inactive or not installed.

Processor: shows the type of CPU the system thinks it has installed.

CPUFlag: is another way of telling the type of CPU.

FPU Type: shows the kind of math coprocessor installed.

Machine Type: is the kind of machine.

MMU Type: is the kind of memory management unit installed.

Physical RAM: displays the amount of memory installed on the motherboard.

ROM Size: shows the size of the Macintosh ROMs on your machine.

System Version: is the version of System software you are running.

Virtual Memory: tells you whether Virtual Memory (either by Apple or Connectix) is on or off.

32/24-bit mode: shows whether the system is running in 32 or 24 bit mode.

Instruction Cache: displays whether the instruction cache (internal to the 68040) is on or off. It should be on for normal operation. Note: the instruction cache is different from the 128K secondary cache.

Data Cache: displays whether the data cache (internal to the 68040) is on or off. It should be on for normal operation. Some system extensions, such as A/ROSE, can disable the data cache and lower the performance of your system. If your Mac does not require the use of the A/ROSE software, we recommend that it be removed from your hard drive. Note: the data cache is different from the 128K secondary cache.

Disk Spinup: displays the number of seconds that the Macintosh will wait at power up for your hard disk(s) to spin up. A value of 0 (the default) will cause the Macintosh to wait for 15 seconds. A maximum of 31 seconds can be specified.

In certain cases, users may need to access the Advanced Features of QuadControl. The Advanced Features window can be accessed by holding down the option key once QuadControl displays its main panel and selecting Advanced Features.

Figure 73 – Advanced Features button

The following screen will appear.

Figure 74 – Advanced Features

Full Speed Memory Locking – (The Default is on.) The Mac ROM on the IIci and older machines provides a feature which allows add-in hardware to lock sections of motherboard memory so that they can write to it directly. On the Quadras, Mac IIvx and others, this function causes a page (8K) of memory to be marked as not cacheable. All other parts of RAM are still cacheable and still operate at full speed. The locked page of memory, however, will always remain uncacheable and thus will not benefit from the internal (on-chip) or secondary caches.

On the older machines, however, the memory locking is very inefficient. If any block of memory is ever locked, the Mac will **turn off the 68040's internal data cache** while the Macintosh is running. Since the majority of the speed increase of the 68040 is due to the on-chip caches, there will only be a very small performance increase when any memory is locked and the Turbo 040 is installed. The instruction cache is still enabled, so programs will EXECUTE faster, but all data operations will be uncacheable and will not even benefit from the secondary caches.

Full Speed Memory Locking – Gives IIci and older Mac owners the same capabilities as those with newer Macintoshes. When this feature is enabled, it leaves the data cache on for all parts of memory except the memory that was specifically locked. This option takes effect immediately, so rebooting is not required.

Note: Owners of the Apple 8·24 GC must remove the GC software from their System Folder in order to use Full Speed Memory Locking.

Possible Problems

There is a chance that the system will crash or have reliability problems with this option enabled. The symptoms are usually random crashes – the Mac will lock up, display a "bomb" box because of a system error or jump into the debugger if one is installed. Most of the time, if Full Speed Memory Locking is turned on, the crashes will happen almost immediately.

In the cases where Full Speed Memory Locking causes the machine to crash, there are a couple of things you can try. It could be an INIT conflict, so try booting with all third-party extensions disabled except those necessary for add-in cards (video accelerators, Ethernet, etc.). If the system still has problems, remove the remaining third party extensions. This may not be a viable option in the case of networking cards, since the networking card usually needs the INIT in order to work at all. For video acceleration, you can usually get by without the INIT. If you still experience problems once all of the corrections have been attempted, please contact DayStar Technical Support at 404-967-2077.

MacsBug Typing Fix – There is a bug in Apple's debugger, MacsBug, which makes typing very sluggish when the Turbo 040 is installed. The **MacsBug Typing Fix** solves this problem, but it will slow down system performance on some operations by about 5%. This option is provided for users that must use MacsBug and are not concerned about slightly slowing down their system.

Advanced User Note: We have provided a software patch that can be added to the *Debugger Prefs* file. This patch solves the speed problem without forcing the 5% performance penalty in all of your other appli-

cations. MacsBug searches the *Debuggers Prefs* file for debugger commands which it calls **dcmds.** There is a **dcmd** resource in the QuadControl file which can be moved into the *Debugger Prefs* using Apple's **ResEdit** program. All you have to do is cut the resource from the file and paste it into the *Debugger Prefs* file. Only perform this operation on backup copies of QuadControl and Debugger Prefs.

Quadra Compatibility - The Turbo 040 provides an added performance enhancement similar to that found on the Quadra 840AV which may cause a very small number of applications to experience problems. This option disables the enhancement to allow problematic applications to run. DayStar has found that versions of CompuServe's CIM prior to 2.2 require this option to be enabled.

Disable Memory Test - Provides the option for disabling Apple's extensive, but time consuming, memory test. A quick and simple test is performed in its place.

Indicator... Allows you to add an icon to the menu bar to show the 68040 CPU's current cache mode. (See page 102 for further information on cache modes.)
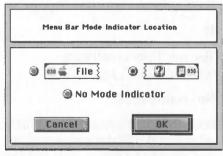
Figure 75 – Menu bar indicator screen

If you experience the following:

The Mac plays a failure tone or will not boot
with the Turbo 040 installed,

<div align="center">or</div>

Virtually every application crashes the
machine,

> **Try:** Disabling the Control Panels and
> Extensions. (If you are running **System 7,**
> simply hold down the Shift key at boot-up.
> If you are running **System 6,** boot from a
> bootable floppy disk and drag all third
> party CDEVs and Extensions out of the
> System Folder and reboot.) Open the Quad
> Control file from your normal boot drive
> and disable Full Speed Memory Locking
> (see page 111).
>
> **Fixed?**
>
> > **No** - continue on
>
> **Try:** Disabling the Control Panels and
> Extensions.
>
> **Fixed?**
>
> > **Yes-** see "Control Panel and Extension
> > conflicts", page 116.
> >
> > **No** - continue on
>
> **Try:** Booting from a bootable floppy disk.
>
> **Fixed?**
>
> > **Yes-** see "System software
> > contamination", page 117.
> >
> > **No** - continue on
>
> **Try:** Booting from a bootable floppy disk,
> with all external SCSI devices turned off
> and the Command, Option, Shift and Delete
> keys held down.

Fixed?

>**Yes**- see "Incompatible formatting software", page 118.

>**No** - continue on

Try: Check with the manufacturer of any NuBus cards you have installed to be sure the board has the latest ROMs for 68040 machines.

Fixed?

>**No** - Contact DayStar Digital Technical Support at 404-967-2077.

Control Panel and Extension conflicts

1. Remove all third party Control Panel and Extension files from the hard disk's System Folder.

2. Restart the Macintosh from the hard disk. (If the Macintosh does not start up properly at this point, it is probably due to a contaminated System Folder. See "System software contamination", page 117.)

3. Starting with the QuadControl file, reinstall the Control Panel and Extension files into the System Folder one at a time. Restart the machine after adding each file until you encounter the problem. After this happens, restart from a floppy disk (or hold down the shift key at boot-up if using System 7) and remove the last file loaded. Proceed again with this systematic check until you have removed all conflicts.

   NOTE: Some conflicts can be overcome by changing the first character of the troublesome file's name. Since these files load alphabetically, this will also alter their loading order.

   It is also possible that the troublesome file is not '040 compatible. Contact the author for the latest version.

   NOTE: If you have a National Instruments GPIB board, you must use NB Handler Control Panel version 4.3 or higher.

If you have disabled all of the non-Apple Control Panel and Extension files and are still having problems, you are probably experiencing system contamination. In order to fix this problem, you will need to do the following:

1. Boot from an Apple installation disk or other bootable floppy disk. Move third party Control Panels, Extensions and Printer fonts to a new folder outside the System Folder. Remove the System Folder on the hard disk by placing it in the trash.

   NOTE: You must throw away the System file instead of installing a new one on top of the old one. DayStar recommends you use Apple's System Installer rather than dragging software over to the hard drive.

2. Using the Apple Installer, reinstall the System software on the hard disk. Copy the QuadControl file to the newly installed System Folder.

3. Restart the Macintosh.

Incompatible formatting software

There are two possible problems that can occur with hard drive or removable disk formatters.

Blind Transfers. Many third party (non-Apple) formatters provide a "blind transfers" option that can cause compatibility problems when upgrading your Mac. For this reason, we suggest that you disable the blind transfers feature before installing the Turbo 040.

Note: Blind transfers ties the SCSI transfer rate to the speed of the CPU. When an accelerator is added to your system, or when you move your drive to a different speed Mac, you can experience SCSI problems. If you wish to use blind · transfers with the Turbo 040, turn on blind transfers with the Turbo 040 installed and update your drivers and it should operate properly at the new speed.

Not-68040 compatible. Some older formatters are not compatible with the 68040 CPU. Upgrading to the latest release of your formatting software and updating your disk's driver will solve the problem.

If you experienced problems just after installing the Turbo 040, the easiest way to update your disk's driver is to remove the Turbo 040, update the disk driver and then reinstall the Turbo 040. If you do not know which software was used to format your troublesome disk, contact the vendor that sold it to you. If you cannot find out which formatter was used or you don't have access to it, you can try to update the driver with a different formatter, but be sure to back up your data first. If this fails, you will need to reformat the disk, again making sure you use a 68040 compatible version of the formatter.

Performance Notes

Now that you have supercharged performance with the Turbo 040, here are some software tips to get the most from your accelerator.

- Check the Turbo 040 Info section of the QuadControl CDEV. If the 68040 Data Cache and Full Speed Memory Locking are both off, turn on Full Speed Memory Locking. (See Advanced QuadControl Options p. 110.)

- Keep the number of Control Panel and System Extension files that you have in the System Folder to a minimum. If you find that you are not using the features of these files, remove them from the System Folder. Not only can these files cause conflicts with one another, they can also rob the system's performance.

- Vary the size of the Apple RAM Cache (or Disk Cache in System 7) to find an optimum setting for your system. The cache is located in the General Control Panel under System 6.x, or in the Memory Control Panel under System 7.x. Setting the cache above 128K with System 6.x often degrades performance.

- Quit out of any '040 incompatible applications as soon as you are finished. Even when applications requiring '030 cache mode are in the background, they will slow the Mac down.

- Check to see if the Apple Real-time Operating System Environment (A/ROSE) software is installed on your Mac (usually located in the System Folder, or the Extension Folder if running System 7). If your networking card does not require A/ROSE, you should remove it from your hard drive for optimal performance.
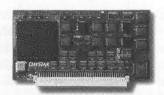
68040 compatible software

- Use versions of software that do not require you to turn off the data cache, such as:

  A/ROSE 1.19 up
  Acius 4th Dimension 2.2.2 up
  Adobe ATM 2.03 up
  Adobe Illustrator 3.0 up
  Adobe PageMaker 4.0 up
  Adobe Persuasion 2.0 up
  Adobe Photoshop 1.06 up
  Adobe TouchBase 2.01 up
  Aladdin Systems StuffIt Deluxe 2.0.1 up
  Apple AppleLink 6.0 up
  Apple AppleShare 2.0.1 up
  Apple HyperCard 2.1 up
  CE QuickKeys 2.1.3 up
  CE QuickMail 2.23 up
  Claris FileMaker Pro 1.0 up
  Claris HyperCard 2.1 up
  Deneba Canvas 2.1 up
  HP DeskWriter 3.1 up
  MacroMedia Director 3.0 up
  MacroMedia FreeHand 3.0 up
  MacsBug 6.2.2 up
  MacWrite II 1.1v1 up
  Microsoft Excel 3.0a up
  Microsoft Word 4.0e up
  Microsoft Mail 3.0a up
  Norton Utilities 2.0 up
  Now Software Startup Manager 3.01 up
  Quark XPress 3.0 up
  Symantec Suitcase II 1.2.8 up
  Symantec Fastback II 2.5 up
  T/Maker WriteNow 3.0 up
  WordPerfect 2.01 up

If you experience problems with an application not listed, contact the developer to ensure that you have a 68040 compatible version.

Product
Support

• System Requirements

- Apple® Macintosh SE/30, II, IIx, IIcx, IIsi, IIvx, IIvi, Performa 600, IIci

• External Cache Architecture

- 128K direct mapped Static RAM cache

• Internal 68040 Cache Architecture

- 4K byte physical instruction cache and
- 4K byte physical data cache (accessible simultaneously)

• Processor

Turbo 040i (without math functions)
- 33 MHz Motorola 68LC040

Turbo 040 (with built-in math functions)
- 33 MHz Motorola 68040
- 40 MHz Motorola 68040

• Software

- QuadControl Control Panel for cache management
- PowerMath to speed up Apple SANE math

• Compatibility

- Compatible with System 6.x, 7.x up and standard Macintosh software and hardware

• Three Year Limited Warranty

Product warranty

DayStar Digital, Inc. warrants that it will repair or replace, at its option, any defective products properly returned to our factory at no additional charge for a period of THREE (3) FULL YEARS from the date the product is purchased by the original end user.

This warranty does not apply if the hardware product has been damaged by accident, misused, or abused installed with non-compatible products, or has been modified in any way, or if the serial number has been removed or defaced. This warranty does not apply to damage or failure of the host computer power supply, analog and/or CPU logic board or any other add-in boards. This warranty is extended only to original end users.

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DayStar protects your investment. Should your need for speed ever increase, we will be happy to inexpensively upgrade you to higher performance. Contact DayStar Customer Service at 404-967-2077 to inquire about upgrades.

Upgrading the Turbo 040

Before you return the product, please call the DayStar Technical Support Department for assistance at 404-967-2077. Many times we can solve problems without asking you to send the board in for service. If the board does need service, please take it back to the dealer who sold it to you first.

How to return your board for service

We will be happy to serve you. Items returned for service must have an RA (Return Authorization) number, which will be issued to you or your dealer when you call DayStar's Technical Support Department. Returned items must be sent back in good condition, unmodified and undamaged, with shipping charges prepaid. DayStar will repair or replace the board and ship it back to you or your dealer. For each item you return, you must enclose your name, address, telephone number, RA number, a description of the problem and a copy of the bill of sale bearing the appropriate DayStar serial numbers as proof of the original date of purchase.

IMPROTANT: Products returned without appropriate authorization on the outside of the package will not be accepted upon arrival at DayStar.

Contacting DayStar online

CompuServe:

DayStar's forum on CompuServe is located in the Mac A Vendor Forum, Section 6. Our corresponding library is LIB 6. Our EMail address is 75300,1544.

AppleLink:

Our software is available in: Third Parties; Third Parties D-G; DayStar Digital; File Library/ Utilities. Our Link address is DAYSTAR.TECH.

America Online:

DayStar's forum is in the Industry Connection Area. Our Address is: DAYSTAR OL.

All correspondence and technical questions should be referred to the above areas or:
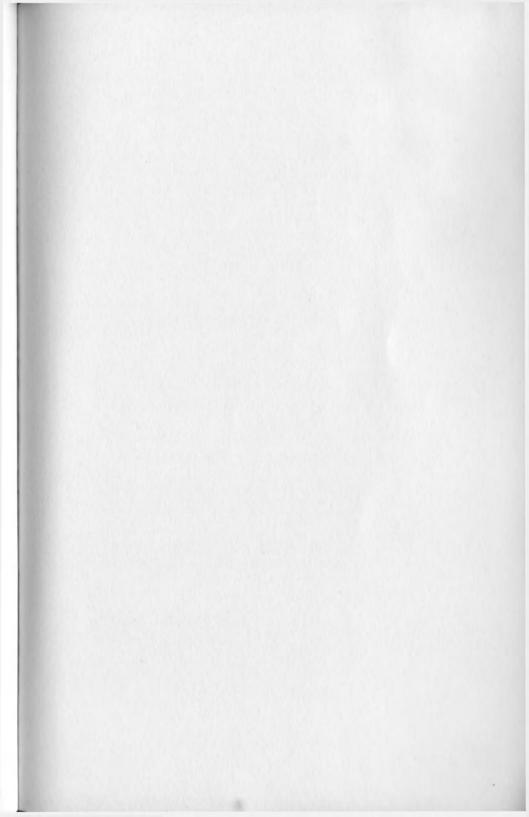
DayStar Digital, Inc.
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404-967-2077

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